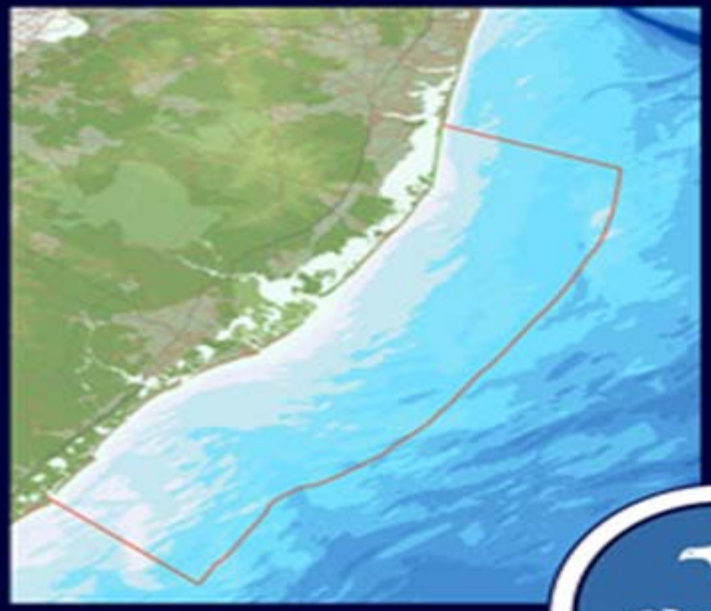
Ocean/Wind Power Ecological Baseline Studies



NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF SCIENCE, RESEARCH, & TECHNOLOGY

Ocean / Wind Power Ecological Baseline Studies

Draft Final Report

Interested Party Group Meeting
June 18, 2010

Gary A. Buchanan, Ph.D.
Project Manager
Manager, Office of Science
NJDEP

Project Significance and Issues

- DATA, DATA, DATA, DATA!!!!
- 1 project in state waters; 4 in federal waters
- $3-4^{+}$ Billion investment
- Data will help support the development of renewable energy projects
- Help assess potential impacts
- Inform NEPA & Federal Consultation process (e.g., ESA)

Project Objectives

- Address Natural Resource portion of Blue Ribbon Panel Recommendation No. 4:
  - "Baseline data should be collected regarding the distribution, abundance, and migratory patterns of avian species, fish, marine mammals and turtles in the offshore area where development may be feasible."

Specific Objectives – Fill Data Gaps

- In the Study Area, what are the abundance, distribution, and utilization of:
  - Bird Species (flight behavior)
  - Marine Mammals
  - Sea Turtles

Specific Objectives

- Using predictive modeling, mapping, and environmental assessment methodologies what portions of the study area are more or less suitable for wind/alternative energy power facilities based on potential ecological/environmental impacts?

STUDY AREA


New Jersey
Tom's River
Barnegat Bay
Barnegat Light
Little Egg Inlet
Mullica River
Great Bay
Great Egg Harbor River
Brigantine
Atlantic City
Great Egg Harbor Bay
Ocean City
Hereford Inlet
VT
NH
NY
MA
CT
RD
PA
NJ
MD
DE
Atlantic Ocean
VA
NC
Area of Enlargement


Ocean/Wind Power
Ecological Baseline Studies

Field Studies

- Three Primary Surveys:
  - Avian
  - Marine Mammal
  - Sea Turtle
- Supporting Studies:
  - Oceanographic

Activity conducted pursuant to NOAA Permit No. 10014-02

Photo by Tony Leukering, GMI


Sana Ana

Photo by Tony Leukering, GMI


GEO-MARINE INCORPORATED
Mobile Avian Radar System
972-423-5480 • www.geo-marine.com
• BIRD-AIRCRAFT STRIKE HAZARD (BASH) RISK MANAGEMENT
• REMOTE ENVIRONMENTAL MONITORING SERVICES
• REAL-TIME BIRD MIGRATION SURVEYS


R/V Robert E.


FURUNO
CAUTION
CAUTION
CAUTION
CAUTION

Other Tasks

- Literature Review
- Data Compilation-digital and historical
- Model Development
- Impact Assessment
- GIS
- Reporting

Schedule

- 24-month study
- Field Work: Jan 2008 – Dec 2009
- Interim Report – March 2009
- Draft Final Report – April 2010
- Final Report – Expected early July

Overall Process

- Technical Review Committee – State & Federal Agencies
- Peer Review Group – Independent Review
- Interested Party Group (stakeholders)
  - Periodic informational meetings

Draft Final Report Summary

- Four Volumes
  - Birds
  - Marine Mammals & Sea Turtles
  - Fisheries
- Modeling
- Sensitivity Index Map
- Data fulfilled Project Objectives!

Geo-Marine, Inc.

Dan Wilkinson, Ph.D.

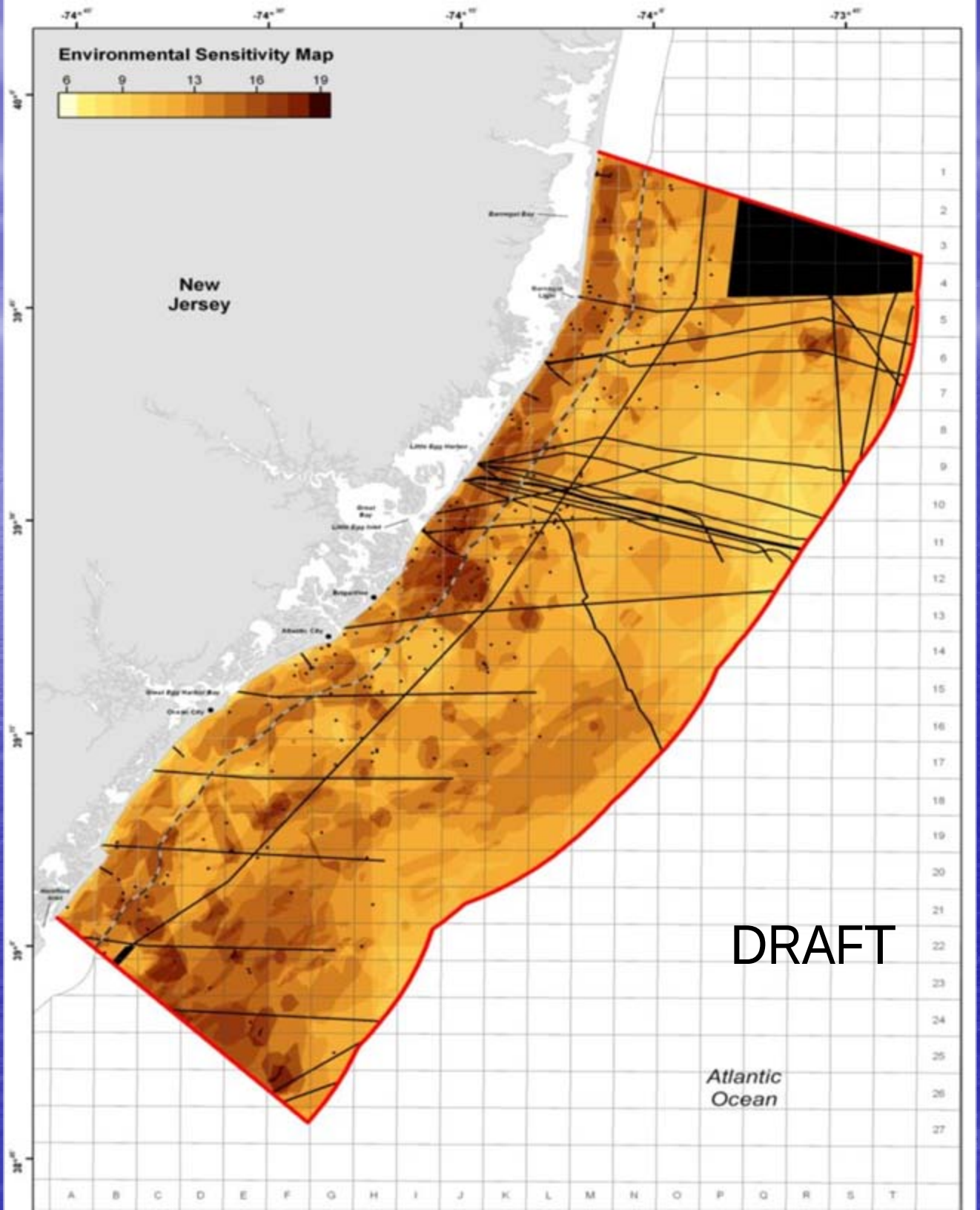
SUMMARY

Sensitivity Map – DRAFT

- Simple weighting of GIS layers by natural & physical resources
- More heavily shaded areas indicate greater potential
- Does not mean can not develop area, but may indicate greater mitigation &/or other costs (e.g., monitoring, construction $ due to avoidance).

Sensitivity Map (cont)

- Tabular listing of all GIS layers by grid block
- Easy ID of sensitive ‘layers’
- Additional site-specific information and risk assessment will be needed to better define risks and potential mitigation


Environmental Sensitivity Map
6
9
13
16
19
New Jersey
Atlantic Ocean
DRAFT


Ocean/Wind Power
Ecological Baseline Studies

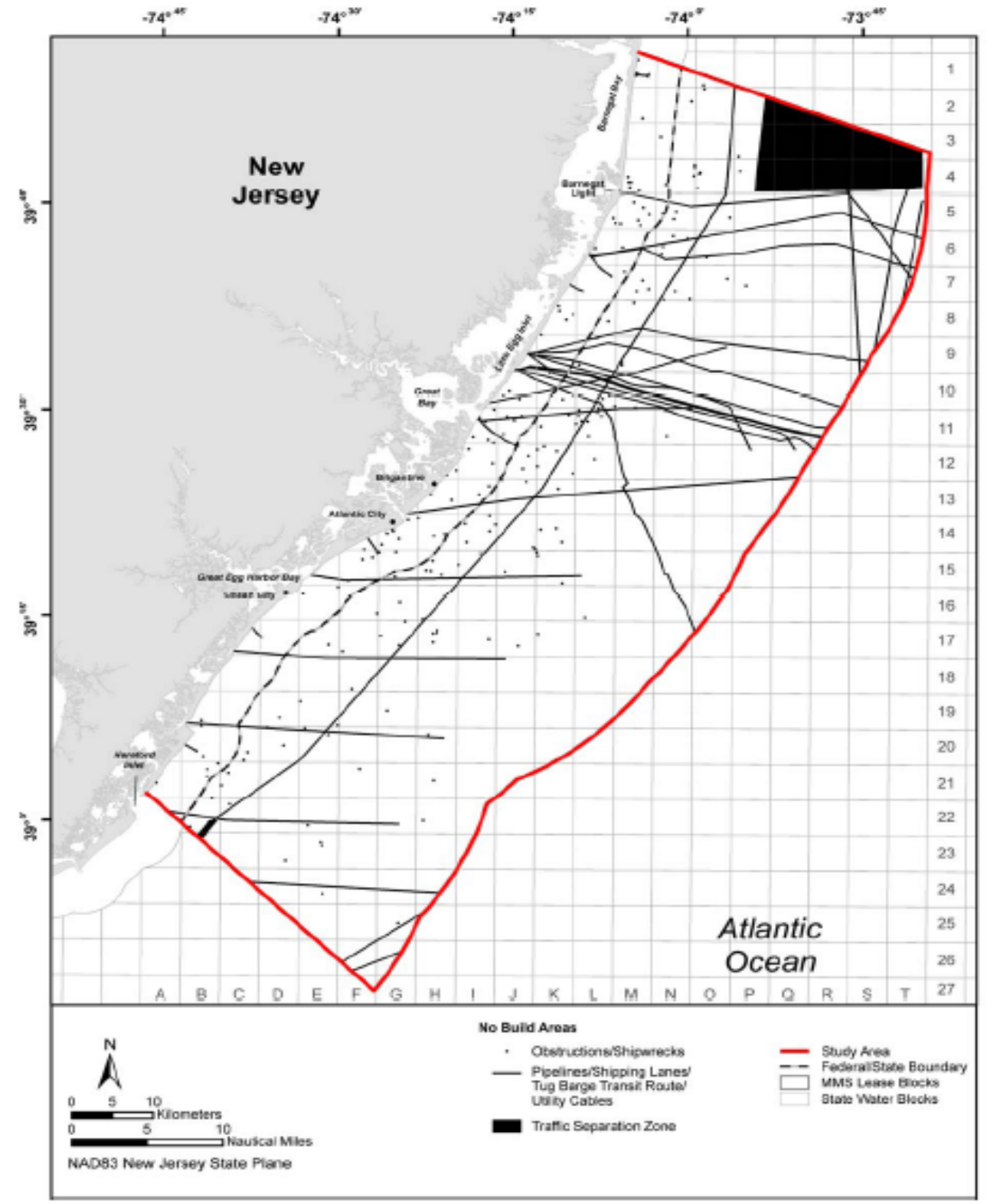


Figure C-1. Map showing the "no build areas" designated in the environmental sensitivity index.

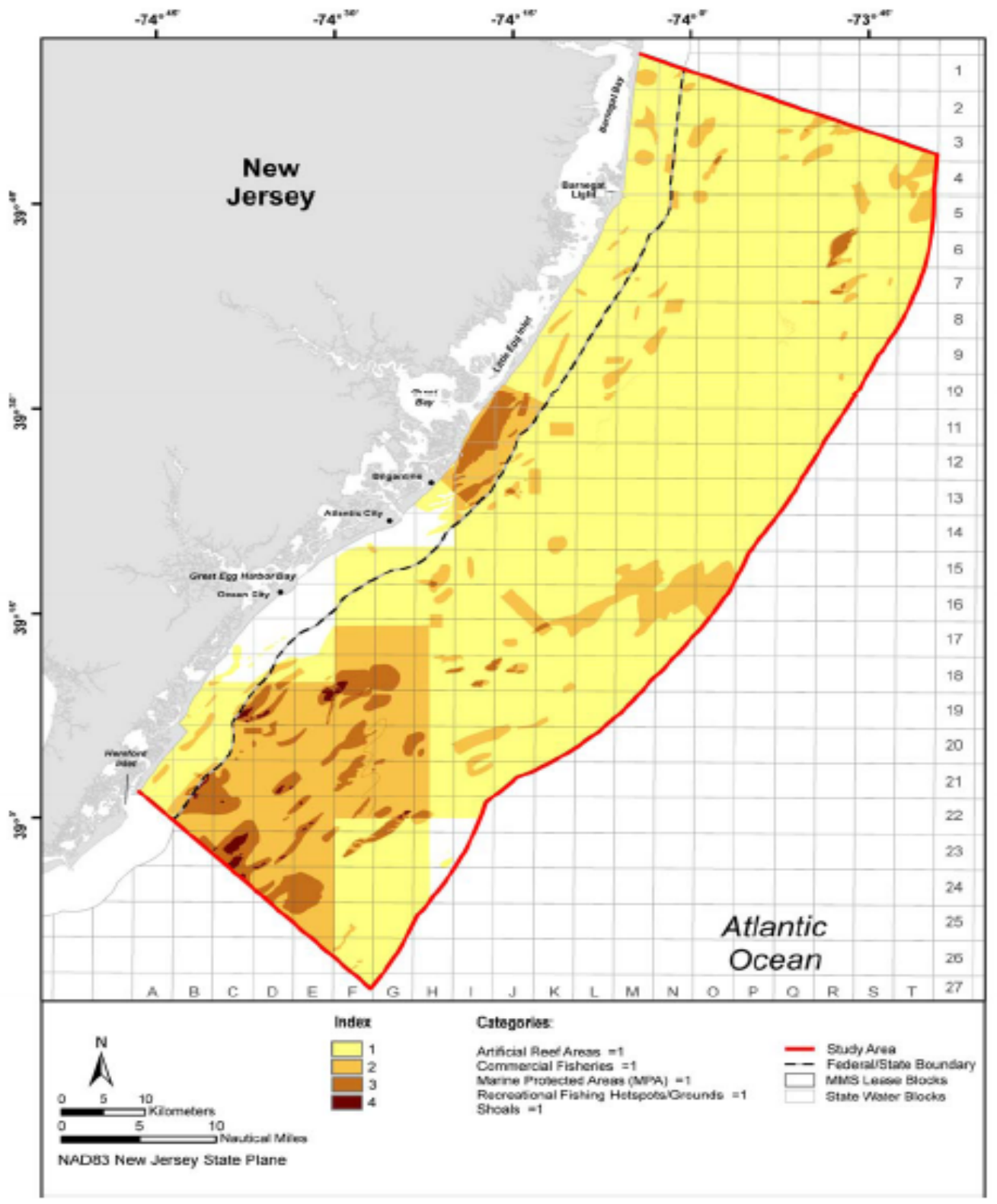
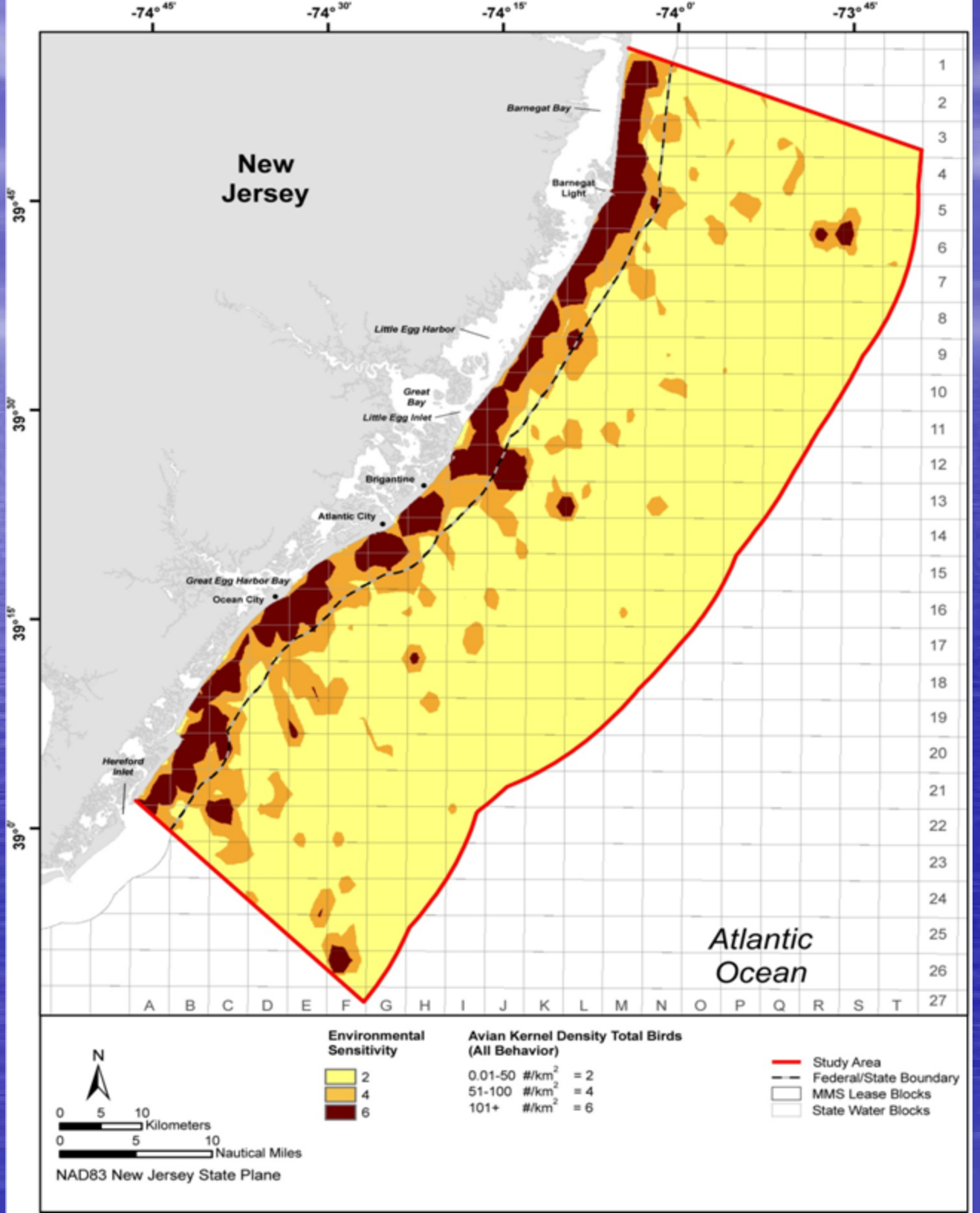


Figure C-2. Map showing the physical features used in the environmental sensitivity index.


Ocean/Wind Power
Ecological Baseline Studies


-74° 45'
-74° 30'
-74° 15'
-74° 0'
-73° 45'
39° 45'
39° 30'
39° 15'
39° 0'
New Jersey
Barnegat Bay
Barnegat Light
Little Egg Harbor
Great Bay
Little Egg Inlet
Brigantine
Atlantic City
Great Egg Harbor Bay
Ocean City
Hereford Inlet
Atlantic Ocean
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27
A B C D E F G H I J K L M N O P Q R S T
N
0 5 10 Kilometers
0 5 10 Nautical Miles
NAD83 New Jersey State Plane
Environmental Sensitivity
2
4
6
Avian Kernel Density Total Birds (All Behavior)
0.01-50 #/km2 = 2
51-100 #/km2 = 4
101+ #/km2 = 6
Study Area
Federal/State Boundary
MMS Lease Blocks
State Water Blocks

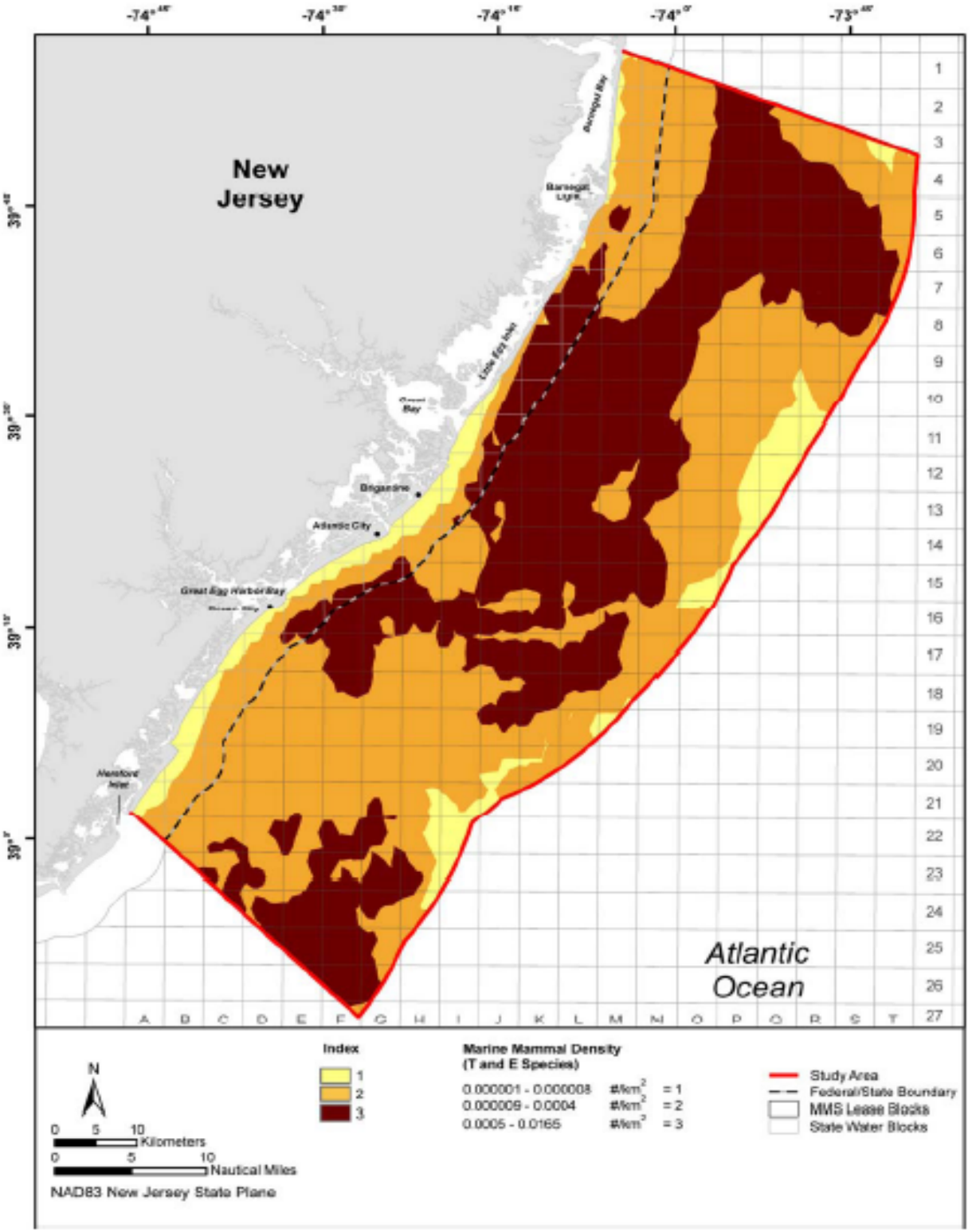
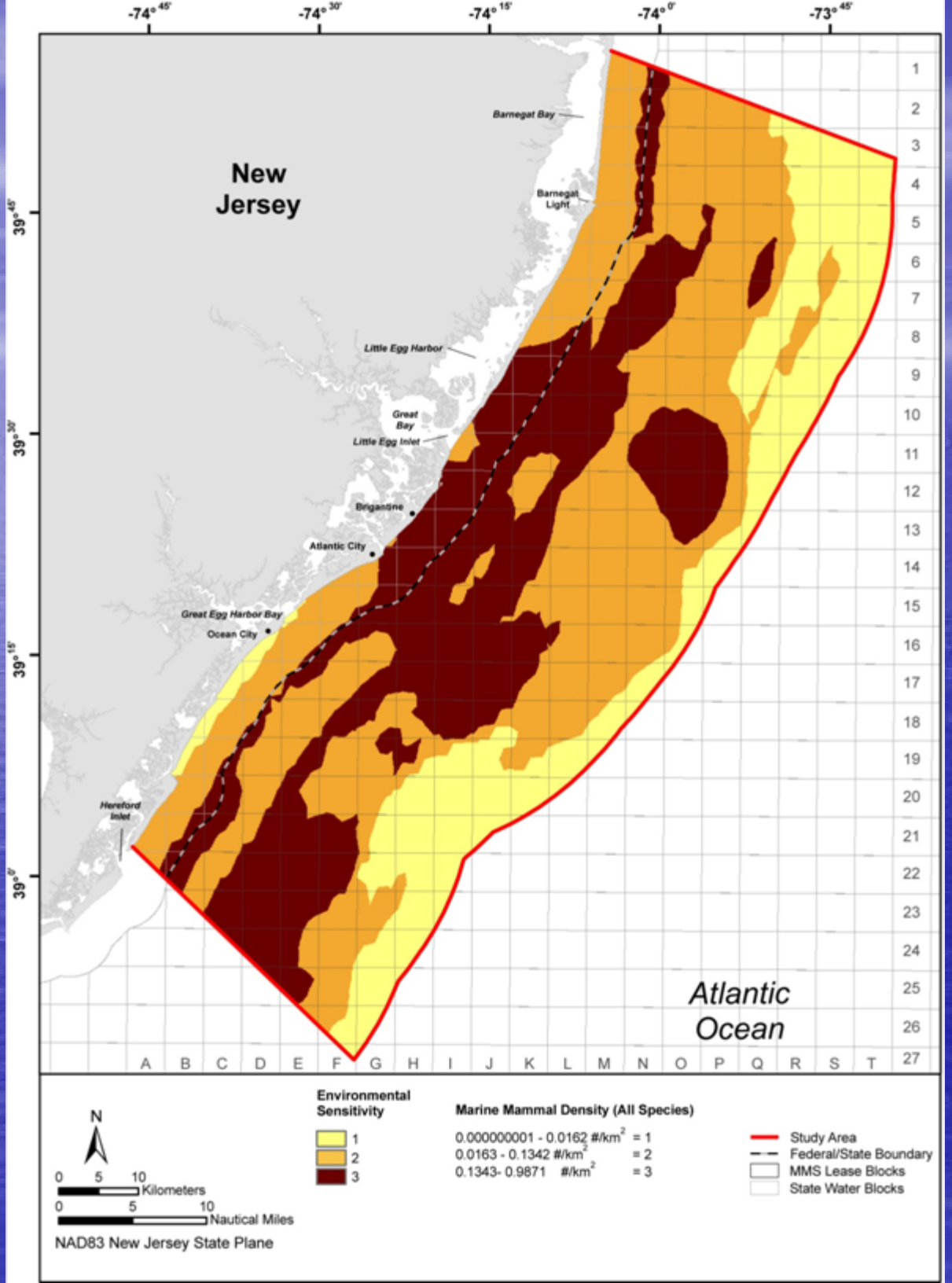


Figure C-5. Map showing the threatened and endangered marine mammal species data used in the environmental sensitivity index.


-74° 45'
-74° 30'
-74° 15'
-74° 0'
-73° 45'
New Jersey
Barnegat Bay
Barnegat Light
Little Egg Harbor
Great Bay
Little Egg Inlet
Brigantine
Atlantic City
Great Egg Harbor Bay
Ocean City
Hereford Inlet
39° 45'
39° 30'
39° 15'
39° 0'
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27
A B C D E F G H I J K L M N O P Q R S T
Atlantic Ocean
N
0 5 10 Kilometers
0 5 10 Nautical Miles
NAD83 New Jersey State Plane
Environmental Sensitivity
1
2
3
Marine Mammal Density (All Species)
0.000000001 - 0.0162 #/km2 = 1
0.0163 - 0.1342 #/km2 = 2
0.1343- 0.9871 #/km2 = 3
Study Area
Federal/State Boundary
MMS Lease Blocks
State Water Blocks


Ocean/Wind Power
Ecological Baseline Studies

Table C-1. Physical and biological features found within each grid cell in the environmental sensitivity index.

Column	Row	Avian Kernel Density - Rank 1	Avian Kernel Density - Rank 2	Avian Kernel Density - Rank 3	Marine Mammal Density (All Species) - Rank 1	Marine Mammal Density (All Species) - Rank 2	Marine Mammal Density (All Species) - Rank 3	Marine Mammal Density (T & E Species) - Rank 1	Marine Mammal Density (T & E Species) - Rank 2	Marine Mammal Density (T & E Species) - Rank 3	Sea Turtle – Rank 1	Sea Turtle – Rank 2	Sea Turtle – Rank 3	Essential Fish Habitat - Rank 1	Essential Fish Habitat - Rank 2	Essential Fish Habitat - Rank 3	Marine Protected Areas (MPA)	Shoals	Commercial Fisheries	Recreational Fishing Hotspots/Grounds	Shipping Lanes	Obstructions	Pipelines	Shipwrecks	Traffic Separation Zone	Tug Barge Transit Route	Utility Cables
A	20	√	√			√		√				√		√	√				√								
A	21	√	√	√		√	√	√	√			√		√	√				√	√		√					
A	22	√	√	√		√	√	√	√			√			√			√	√		√						
B	18		√	√	√	√		√				√		√	√				√	√							
B	19	√	√	√	√	√		√	√		√	√		√	√				√	√	√	√		√			
B	20	√	√	√		√		√	√			√		√	√				√	√		√	√				
B	21	√	√	√		√			√			√			√		√	√	√	√		√		√			
B	22	√	√	√		√	√		√			√			√		√	√	√	√	√			√	√	√	
B	23	√					√		√	√		√			√		√	√	√						√	√	
C	16		√		√			√				√		√													
C	17	√	√	√	√	√		√	√			√		√	√					√	√		√				
C	18	√	√	√	√	√		√	√			√		√	√			√	√	√							
C	19	√	√	√	√	√			√			√			√		√	√	√	√	√						
C	20	√	√	√		√			√			√			√		√		√	√	√			√			
C	21	√	√	√		√	√		√			√			√		√	√	√					√		√	
C	22	√	√	√		√	√		√	√		√			√	√	√	√	√	√	√			√		√	
C	23	√	√			√	√		√	√		√			√	√	√	√	√	√							
C	24	√	√				√		√	√		√	√			√	√	√	√	√	√						
D	16	√	√	√	√	√		√	√	√		√		√	√												
D	17	√	√	√	√	√	√		√	√		√		√	√					√	√		√				
D	18	√	√		√	√	√		√			√			√		√	√	√	√	√						
D	19	√	√	√	√	√			√			√			√		√	√	√	√				√			
D	20	√	√			√			√			√			√		√	√	√	√	√	√		√		√	
D	21	√	√			√	√		√			√			√	√	√	√	√	√						√	
D	22	√	√			√	√		√	√		√	√		√	√	√	√	√	√	√						
D	23	√	√			√	√		√	√		√	√			√	√	√	√	√		√					
D	24	√	√			√	√		√	√		√	√			√	√	√	√	√	√						
D	25	√				√	√		√	√			√			√	√		√	√							
E	15	√	√	√	√	√		√	√			√		√	√				√	√	√						
E	16		√	√	√	√			√	√		√		√	√				√			√		√			
E	17	√	√	√		√	√		√	√		√			√		√		√					√			
E	18	√	√	√		√	√		√			√			√	√	√	√	√	√	√						
E	19	√	√	√		√			√			√			√	√	√	√	√	√				√		√	

Final Report

- Information and data can be used for:
  - Baseline data for projects in study area (NEPA)
  - Design of future monitoring
  - Screening of potential sites
  - ID Areas for MMS ‘Request for Interest’
  - Planning for Phase II Wind Facilities

Final Report (cont)

- Estimate of potential impacts on natural resources
- Listing of species that may be impacted including T&E species
- Estimate of relative scale of potential mitigation

Final Report (cont)

- Indication of areas that have limited potential for impacts
- Areas that have greater potential for impacts
- Site-specific information
- Data, data, data, data!!!!

Acknowledgments –

Technical Review Committee - NJDEP

- Coastal Management – Kevin Hassel
- Fish & Wildlife – ENSP
  - Dave Golden
  - Sharon Petzinger
  - Jeanette Bowers
- Marine Fisheries - Don Byrne
- Wildlife Management - Ted Nichols
- NJGS – Jane Uptegrove
- Permit Coordination – Ken Koschek
- Land Use Management – Tom Micai
- DSRT/Office of Science
  - Joe Bilinski, Gail Carter, Joel Pecchioli (SRP)

Acknowledgements (cont)

- USFWS - Carlo Popolizio & Doug Forsell
- NOAA/NMFS
  - Gordon Waring, Ph.D.
  - Debra Palka, Ph.D.
  - Karen Greene
- Minerals Management Service - Will Waskes
- **Project Team: Geo-Marine, Inc.**
  - **Rutgers University**
  - **Aqua Survey Inc.**

Dedication to Gail Carter

In Memoriam

QUESTIONS?

Office of Science website:

http://www.state.nj.us/dep/dsr/

Activity conducted pursuant to NOAA Permit No. 10014-02
Photo by Tony Leukering, GMI